In the Claims

Claims 1 - 14 (Cancelled)

15. (New) A method of estimating precipitation characteristics comprising:

acquiring a radar image including at least a vertical plane of a precipitation zone;

processing a vertical profile to generate digital signals representative of reflectivity in vertical direction z;

integrating the signals representative of reflectivity by assimilation of a reflectivity vertical profile in an aggregation model to generate a signal representative of the profile in the vertical plane of a mean particle diameter weighted by mass of each particle; and

determining concentration of the solid particles on the basis of signals previously determined.

16. (New) The method according to claim 15, wherein integrating comprises determining variable Z(h) of the radar image observable in mm^6/m^3 as a function of altitude h on the basis of the radar image, and determining the mean diameter Dm(h) of the particles with the following equation:

$$\frac{fD_m}{fh} = -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{1 \; 1 \; fZ}{6 \; Z \; fh} \right) D_m \qquad \underline{(2)}$$

where:

Z is the radar image to be inverted in mm^6/m^{-3};

D_m is in meters (m);

a and *b* are coefficients specific to aggregate particles;

k_{eff} is the coefficient of effectiveness of aggregation to be adjusted.

17. (New) The method according to claim 16, wherein the coefficient k_{eff} is equal to 0.3.

18. (New) The method according to claim 16, wherein the coefficient *a* is equal to 35184.

19. (New) The method according to claim 16, wherein the coefficient *b* is equal to 3.16.

20. (New) The method according to claim 15, wherein the integration constant is determined so that the value $D_m(h)$ at the top of a cloud corresponds to the predetermined value for the total number of particles at the top of the cloud.

21. (New) The method according to claim 15, wherein the profile of the total number of particles $n_t(h)$ is determined by the following equation:

$$n_T(h) = x.Z(h)/D_m(h)^6.$$

22. (New) The method according to claim 15, wherein x is equal to $25.4\ 10^{-18}$.

23. (New) The method according to claim 15, wherein meteorological parameter $N_O(h)$ is determined by the following equation:

$$N_O(h) = y.Z(h)/D_m(h)^7.$$

24. (New) The method according to claim 15, wherein y is equal to $102\ 10^{-18}$.

25. (New) The method according to claim 15, wherein the meteorological parameter corresponding to the profile of the ice water content *IWC(h)*(in g/m^3) is determined by the following equation:

$$IWC(h) = wZ(h)/D_m(h)^3.$$

26. (New) A method according to claim 25, wherein w is equal to $1.25\ 10^{-12}$.

27. (New) A profile determined according to claim 15, wherein the meteorological parameter corresponding to a profile of solid precipitation rate R(h) (mm/h equivalent melted) is determined by the following equation:

$$R(h) = r.Z(h)/D_m(h)^{2.35}.$$

28. (New) The method according to claim 15, wherein characterized in that r is equal to $4.698\ 10^{-10}$.

29. (New) A method of estimating precipitation rate for solid precipitation comprising:

an acquisition step comprising acquiring a radar image including at least a vertical plane of a precipitation zone and processing a vertical profile to deliver digital signals representative of reflectivity in the vertical direction z;

an integration step comprising integrating signals representative of reflectivity by assimilation of the reflectivity vertical profile in an aggregation model to deliver a signal representative of the profile in the vertical plane of a mean particle diameter weighted by mass of each particle; and

a determination step comprising determining concentration of the solid particles on the basis of the signals determined in the preceding steps.

30. (New) The method according to claim 29, wherein the integration step comprises determining variable Z(h) of the radar image observable in mm^6/m^3 as a function of the altitude h on the basis of the radar image, and determining the mean diameter Dm(h) of the particles with the following equation:

$$\frac{fD_m}{fh} = -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{1}{6} \frac{1}{Z} \frac{fZ}{fh} \right) D_m \qquad \underline{(2)}$$

where:

Z is the radar image to be inverted in mm^6/m^{-3};

D_m is in meters (m);

a and *b* are coefficients specific to aggregate particles;

k_{eff} is the coefficient of effectiveness of aggregation to be adjusted.

31. (New) The method according to claim 29, wherein the integration constant is determined so that the value $D_m(h)$ at the top of a cloud corresponds to the predetermined value for the total number of particles at the top of the cloud.

32. (New) The method according to claim 29, wherein the profile of the total number of particles $n_t(h)$ is determined by the following equation:

$$n_T(h) = x.Z(h)/D_m(h)^6.$$

33. (New) The method according to claim 29, wherein meteorological parameter $N_O(h)$ is determined by the following equation:

$$N_O(h) = y.Z(h)/D_m(h)^7.$$

34. (New) The method according to claim 29, wherein the meteorological parameter corresponding to a profile of ice water content *IWC(h)*(in g/m^3) is determined by the following equation:

$$IWC(h) = wZ(h)/D_m(h)^3.$$